WHAT WE CLAIM IS:

1. A process of producing a functionally graded sheet of material that undergoes a transformation from an original property to a transformed property when subjected to energy input, which process comprises: irradiating a surface of the sheet article with an energy beam having an energy level and duration effective to modify said original property of the material of the sheet article to provide said material with said transformed property, without causing melting of said material, wherein the energy beam is directed into a plurality of zones forming a pre-determined repetitive pattern over the surface of the sheet, thereby creating, within at least one region of said sheet article having said original property, a plurality of mutually spatially separated zones of said material provided with said transformed property arranged in said repetitive pattern.

2. The process of claim 1, carried out on a sheet article made of a metal alloy.

3. The process of claim 1, carried out on a sheet article made of an aluminum alloy.

4. The process of claim 1, wherein said energy level of said energy beam is sufficient to cause said convert said original property to said transformed property through the entire thickness of the sheet article in said plurality of zones.

5. The process of claim 1, wherein the original property of the material is that the material is in a solutionized condition, and wherein said energy beam is used to modify the material to produce an age-hardened condition as said transformed property.

6. The process of claim 1, wherein the original property of the material is that the material is in an age-hardened condition, and wherein said energy beam is used to modify the material to produce a solutionized condition as said transformed property.

7. The process of claim 1, wherein the original property of the sheet is that the sheet is in a work-hardened condition, and wherein said energy beam is used to modify the material to produce a transformed property selected from the group consisting of recovered, recrystallized and annealed.

8. The process of claim 1, wherein the original property of the material is that the material is in a condition selected from the group consisting of recovered, recrystallized and annealed, and wherein the energy beam is used to modify the material to produce a work-hardened condition as said transformed property.

9. The process of claim 1, wherein the original property of the material is that the material is in an unhardened condition, and wherein the energy beam is used to implant ions in the sheet to produce hardening as said transformed condition.

10. The process of claim 1, wherein the energy beam is selected from the group consisting of a laser beam, an electron beam and an ion beam.

11. The process of claim 1, wherein the energy beam is a water jet.

12. A functionally graded sheet article made of a material that undergoes a transformation from an original property to a transformed property when subjected to energy input, said sheet article having been produced by a process according to claim 1.

13. The functionally graded sheet article of claim 12, wherein said material is an aluminum alloy.

14. A functionally graded aluminum alloy sheet article, comprising a material having a surface provided with a plurality of spatially separated zones forming a pre-determined repetitive pattern within said surface, wherein the material within said zones has a property different from the material in said remainder of said material.

15. The sheet article of claim 14, wherein said zones having said property different from said remainder of said material extend completely through said sheet article.

16. The sheet article of claim 14, wherein said material is an aluminum alloy.

17. The sheet article according to claim 14, wherein said zones are approximately circular with a diameter in the range of 400 nm to 50 microns.

18. The sheet article according to claim 16, wherein the alloy in said zones is age-hardened and the alloy in said remainder is solutionized.